

NAVAL WAR COLLEGE  
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**Information Warfare and the Operational Art**

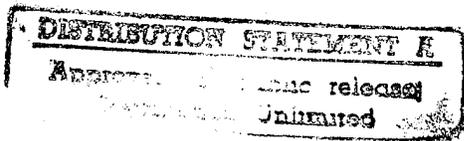
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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Joint Military Operations Department.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.



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**ABSTRACT OF  
INFORMATION WARFARE AND THE OPERATIONAL ART**

Command and Control Warfare (C2W), the military strategy for implementing Information Warfare (IW), is self-limiting by definition. Taken individually, the components of C2W -- operational security, psychological operations, military deception, electronic warfare and physical destruction -- are not representative of significant changes in technology nor warfare. The continued effort to expand the military strategy of IW beyond the current bounds of C2W may be indicative of a technology-strategy mismatch or disconnect.

An analysis of C2W through the lens of operational art reveals the limited nature of current C2W strategy. The elements of C2W do not provide a basis upon which to build a broader IW strategy supported by emerging information technologies. C2W must be expanded into three broad areas -- information protection, information operations and information dominance -- to best serve the needs of the operational commander.

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## CHAPTER I

### DEFINITIONAL AMBIGUITY

Information has always been a valued commodity. Sun Tzu suggested, nearly 2500 years ago, to “. . . (k)now the enemy and know yourself; in a hundred battles you will never be in peril.”<sup>1</sup> Today, information-related technologies are linked to all facets of American society. As these technologies evolved, so have their usefulness to warfare.<sup>2</sup> Information-related technologies are transforming military operations by providing commanders with unprecedented timely, specific and accurate information in substantial quantities.<sup>3</sup> Information technologies have also redefined the basis of power among nation-states. Joint Publication 3-0, Doctrine for Joint Operations, defines the instruments of national power as diplomacy, economics, military force and information.<sup>4</sup> If information is a dynamic of national power, then Information Warfare (IW) should express the utility of information as an instrument of military power.

Despite the current availability and distribution of information-related technologies, the United States (U.S.) military is struggling to define IW and the nature of warfare in the Information Age. IW is a complex and multi-dimensional concept.<sup>5</sup> This multi-dimensionality directly contributes to its current state of definitional ambiguity. IW may be regarded as a weapon, a target, an operational realm, a strategy, a technical revolution or as a revolution in the nature of warfare.

The multi-dimensionality of IW is similar to that of maneuver. Maneuver is simultaneously a dynamic of combat power, an operational function, a principle of war,

and a form of strategy. Unlike IW, the multi-dimensionality of maneuver are not in competition with one another. The operational commander can appreciate the subtleties that define the various uses of the term maneuver.

The struggle within the U.S. military is about more than defining IW. Service roles and missions in an era of declining budgets are the underlying basis for many unresolved issues surrounding IW. Currently, the U.S. military relies upon the Chairman of Joint Chiefs of Staff (CJCS) Memorandum of Policy (MOP) 30 for the official joint service definition for the implementation of IW. Command and Control Warfare (C2W) is the U.S. military strategy for the conduct of IW on the battlefield.<sup>6</sup> CJCS MOP 30 defines C2W as:

(t)he integrated use of operations security (OPSEC), military deception, psychological operations (PSYOP), electronic warfare (EW), and physical destruction, mutually supported by intelligence, to deny information to, influence, degrade or destroy adversary C2 capabilities, while protecting friendly C2 capabilities against such actions. Command and Control Warfare applies across the operational continuum and all levels of conflict.<sup>7</sup>

C2W has an offensive (Counter-C2) and defensive (C2-Protect) component.

History has shown that the emergence and distribution of new technologies such as bomber aircraft, armored vehicles and submarines preceded the doctrine necessary to fully employ and exploit technological advances.<sup>8</sup> However, it is difficult to connect C2W's reliance on EW, PSYOP, OPSEC, military deception and physical destruction with any of the information technologies associated with the military technical revolution

(MTR). The continued effort to expand the military strategy of IW beyond the current bounds of C2W may be indicative of a technology-strategy mismatch or disconnect.

The primary concerns of an operational commander are the planning, preparation, conduct and sustainment of major operations and campaigns. Operational art provides a methodology for an operational commander to envision and express the elements of an operation, campaign, or strategy coherently. By using the framework of operational art to evaluate C2W as a strategy, the weaknesses, gaps, disconnects and ambiguities of C2W may be identified and assessed. Additionally, an analysis of C2W through the prism of operational art may also suggest potential solutions to IW/C2W's definitional ambiguity.

## CHAPTER II

### DID THE PARADIGM SHIFT?

A paradigm shift is a change in the way one may think about things.<sup>9</sup> It suggests that a new pattern of thought may be applied to an old task -- in this case, the conduct of war. "War is thus an act of force to compel our enemy to do our will."<sup>10</sup> The concept of C2W, as currently defined and demonstrably executed during Operation Desert Storm, does not diverge from Clausewitz's definition of war. The Gulf War C2W strategy did not demonstrate a new model of thought on the role of information in warfare. However, the conduct of C2W in the Gulf War validated the value of the tenets of warfare such as synchronization.

EW, PSYOP, OPSEC and military deception were often ignored or inadequately integrated into the overall concept of the operation. As a result of the Gulf War, C2W now provides an effective framework for synchronizing and integrating these components -- much like a fire support annex and air tasking order (ATO) synchronize and integrate operational fires. C2W, like operational fires, allows the commander to shape the battlefield and establish military conditions to achieve strategic goals.

While C2W acknowledges the importance of information as a target to be protected or destroyed, it does not acknowledge the utility of information as a force or as an element of combat power. General Grant was the first military commander to use the telegraph as a means to control his large and dispersed forces.<sup>11</sup> The telegraph provided General Grant greater freedom of action over his opponents by increasing the operational

tempo to a level the Confederate Army could not sustain. The telegraph represented the enhancement of combat power through information. The telegraph was also vulnerable to intercept and destruction by the Confederate Army. General Grant's employment of information by way of the telegraph and the Confederate Army's response could be considered appropriate IW operations within an expanded framework of IW/C2W.

Taken individually, the components of C2W -- OPSEC, PSYOP, EW, military deception and physical destruction -- are not representative of the information revolution.

The combat function most closely associated with the military technical revolution, battle command, is not a component or "pillar" of C2W.<sup>12</sup> Battle command has "... three fundamental concerns: visualizing the current state and desired future state, deciding how to get from one to the other and then leading the force to that future state..."<sup>13</sup> The very ability to make and enact these decisions before an opponent can act enables a commander -- as General Grant did -- to operate at a tempo the adversary cannot sustain.<sup>14</sup>

Colonel Boyd's non-famous "OODA Loop"-- observe, orient, decide and act decision model --succinctly represents the functions of command and control (C2).<sup>15</sup> Current C2W strategy attempts to destroy an opponent's "OODA Loop" while preserving our own. C2W does not allow for "out commanding" an opponent or that dominant battlefield awareness can be just as effective as any other element of C2W to defeat an opponent.

It is too soon to suggest that the U.S. military has undergone a paradigm shift. The model for the Gulf War was developed to fight and win along the inner German border. The preponderance of technology used in Operation Desert Storm and the manner in which it was used may not exactly translate to future conflicts similar to Haiti, Somalia and Bosnia. However, the elements of operational art are evident in the campaigns of Napoleon, the Allies during World War II and the Coalition of the Gulf War and remain a credible method for assessing strategy regardless of paradigms and technologies.

## CHAPTER III

### IW/C2W AND THE OPERATIONAL ART

Using the facets of operational art as described in Joint Publication 3-0, Doctrine for Joint Operations, as a framework for the analysis of C2W serves several purposes.

The first purpose is to assess the links between C2W, the operational commander and joint doctrine. The second purpose is to identify the limits of C2W and potential areas for expansion of the C2W strategy.

**SYNERGY.** The synchronization and integration of the full range of capabilities (air, ground, sea, space and special operations) into full dimensional operations against the enemy generates synergy.<sup>16</sup> By definition, C2W employs the synergy of its five "pillars" -- EW, PSYOP, OPSEC, military deception and physical destruction -- through integration and synchronization of effects against an enemy's C2. The Gulf War C2W strategy relied on all capabilities, from special operations against integrated air defense systems (IADS) to air strikes against Iraqi C2 facilities in Kuwait and Iraq, mutually supported by space-based sensors.

The successful generation of synergy evolves from the various commanders' shared understanding of the operational situation.<sup>17</sup> Information technologies, currently used by the U.S. Army's experimental Force XXI and the U.S. Marine Corps, seek to provide a "common picture" of the battlefield to dispersed forces and across all echelons. Improved situational awareness accelerates the "OODA Loop" process to allow the application of the full range of military force at the critical time and place. The

discussion of synergy raises the issue of whether information may be considered a discrete capability or dimension of combat power, or if it remains subsumed within other domains. The issue is not resolved in the current strategy of C2W.

**SIMULTANEITY AND DEPTH.** Simultaneity refers to concurrent operations at all echelons directed against the full range of enemy capabilities. Depth seeks to destroy enemy capabilities before they can be brought to bear in combat operations. C2W represents an expansion in the depth of operations. Through attacks against an opponent's information and information infrastructure, C2W has the potential to deny an enemy the use of sanctuaries.<sup>18</sup> However, it is unclear which component of C2W has the capability to manipulate, alter and contaminate an opponent's information, obscure the enemy's perceptions or alter an opponent's situational awareness. Traditionally, PSYOP and military deception were limited by the ability of an opponent to observe and orient on them. While information technology exists to enter an opponent's information infrastructure, this type of operation is not adequately addressed by PSYOP or military deception as envisioned in CJCS MOP 30.

To ensure the simultaneity of friendly operations requires considerable coordination and battlefield awareness. Friendly position location reporting and identification of friend or foe (IFF) technologies are components of information that facilitate simultaneous operations. IW should expand its definition to incorporate those information operations that improve battle command and enhance combat power.

**ANTICIPATION.** The ability to remain alert for the unexpected and for opportunities to exploit the situation is the essence of both anticipation and the concept of the "OODA Loop."<sup>19</sup> At the core of anticipation is the realization of information as power. Information technologies that support intelligence fusion, maneuver control, planning, rehearsals and terrain analyses, for example, generate dominant battlefield awareness. By achieving dominant battlefield awareness, commanders have the ability to visualize "... relationships between enemy forces, friendly forces, the environment and the desired end state in time, space and purpose."<sup>20</sup> The visualization of these relationships may reveal opportunities and challenges that focus the commander's efforts to best achieve the objective. While C2W provides a framework to deny an opponent dominant battlefield awareness, it does not include friendly dominant battlefield awareness as force component of its strategy.

**BALANCE.** The appropriate mix of forces and capabilities as well as the nature and timing of operations provides balance.<sup>21</sup> Commanders strive to maintain friendly force balance while disrupting the enemy's balance. Current C2W strategy employs the concept of balance very well. C2W's synchronized and integrated use of multiple disciplines disrupts an opponent's balance.

During Operation Desert Storm, air strikes sought to "sever the head of the snake" or break Saddam's C2. The physical destruction effort was balanced by EW, intelligence operations and PSYOP. The threatened use of U.S. Marines to make an amphibious assault against Iraqi forces in Kuwait, continuously reported by Cable News

Network (CNN), blurs the distinction between PSYOP and military deception. It also highlighted a different form of balance -- the enemy commander's perceptions. The alteration of Saddam's perception of battlefield dynamics through physical destruction of C2 nodes, military deception and PSYOP disrupted the balance of Iraqi forces. As a result, Iraqi forces were poorly positioned to oppose the successful Coalition attack.

**LEVERAGE.** The gaining, maintaining, and exploiting advantages in combat power across all dimensions is the centerpiece of operational art.<sup>22</sup> Leverage is similar to concept of maneuver in that both seek to keep the enemy off balance and retain freedom of action. On one level, C2W uses its multi-dimensional components to defeat an opponent's C2, which accrues many advantages to the friendly force. On another level, the ability to rapidly gather and process quality information produces an operational tempo that the enemy's decision cycle cannot sustain. An expansion of the C2W strategy to include other information operations may provide greater leverage and improve the utility of IW to the operational commander.

**TIMING AND TEMPO.** Commanders should conduct operations at a rate or pace and at a point in time that best exploits friendly capabilities and inhibits the enemy.<sup>23</sup> The destruction or degradation of an opponent's C2 may disrupt the tempo and timing of the enemy. The Gulf War C2W effort effectively paralyzed the Iraqi forces who were unable to maneuver in response to the Coalition attack. A commander relies on information to gauge the timing and establish the tempo of an operation to avoid reaching a culmination point before successfully attaining the objective. Information

technologies associated with battle command functions and battlefield awareness generate the information contribution to this facet of operational art.

**OPERATIONAL REACH AND APPROACH.** The distance over which a military force can be concentrated and decisively employed is operational reach.<sup>24</sup> Traditionally, the direction of approach or lines of operation (LOO) and distance were greatly influenced by geography. Space-based sensors, sensor-to-shooter technologies, the global positioning system (GPS), “smart” weapons and unmanned aerial vehicles (UAV) are extending the reach of the operational commander. New technologies also allow dispersed forces to concentrate or mass affects of military power. IW may extend the reach of military power free from the effects of geography. The technology exists to enter an opponent’s information infrastructure and create havoc within it. Cyberspace is without boundaries and sanctuaries. It is not clear that this type of “information attack” is included in C2W.

**FORCES AND FUNCTIONS.** Campaigns and operations can focus on defeating either enemy forces or functions, or a combination of both.<sup>25</sup> By definition, C2W focuses on defeating the enemy’s C2 function. C2W targeting may consider a combination of forces and C2 functions. For example, PSYOP may be applied against an enemy force to undermine the enemy’s C2. During the Gulf War, PSYOP leaflets were used in conjunction with B-52 air strikes to demoralize Iraqi forces and undermine their loyalty to Saddam. C2W is self-limiting in that it does not target all information functions of a hostile opponent.

**ARRANGING OPERATIONS.** The best arrangement of major operations will often be a combination of sequential and simultaneous operations.<sup>26</sup> The difficulty in phasing and sequencing operations is recognizing the conditions for transition or to trigger a particular phase, branch or sequel. Information technologies associated with battle command functions can detect and identify the conditions to end one phase and begin another. Current C2W strategy does not recognize this element of information operations.

**CENTERS OF GRAVITY.** "... (T)he hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed."<sup>27</sup> The enemy's center of gravity (COG) is not a weakness. It is the most concentrated aspect of the enemy's combat power; that which is most vital in the accomplishment of the enemy's aims.<sup>28</sup> The Gulf War C2W effort was disappointing in that it did not result in the removal of Iraqi forces from Kuwait prior to conduct of the ground war. C2 was not the Iraqi COG, but it was vulnerable to attack.

As advanced societies become increasingly dependent on information and information technologies, they will become more vulnerable to IW. A nation's information infrastructure may be a path to a nation's COG -- the will of its people. It is often difficult to detect and identify an opponent's COG. COG's may exist at various echelons -- strategic and operational, for example. Dominant battlefield awareness can aid in detecting, identifying and isolating an opponent's COG.

**DIRECT VERSUS INDIRECT.** An opposing force has three distinct aspects -- strengths, weaknesses and vulnerabilities.<sup>29</sup> An element of strength may be an enemy's COG. To attack a strength or COG is a direct approach. To attack an enemy's weaknesses that are also vulnerable is an indirect approach. C2W is primarily an indirect path to the enemy's strength. An opponent's information infrastructure presents a target rich environment currently beyond the scope of C2W by definition and ability to attack. Emerging IW technologies may expose an increasing number of enemy weaknesses as vulnerabilities.

**DECISIVE POINTS.** Geographic or manmade features that may potentially influence the outcome of an action or provide a marked advantage over the enemy are decisive points.<sup>30</sup> C2 nodes, networks, switches and facilities may be considered decisive points in C2W. C2W strategy designates the most important C2 decisive points as objectives and allocates resources to control, destroy or neutralize them. Current C2W strategy does not necessarily identify all information-related features as decisive points.

As IW matures, decisive points may become unreferenced locations in Cyberspace or in the mind of the opposing commander. The ability to alter the perceptions of the commander may require the undetectable corruption of the data or information. C2W does not address this type of "information attack."

**CULMINATION.** Synchronization of logistics with combat operations can forestall the point in time and space at which combat power no longer exceeds that of an opponent.<sup>31</sup> Commander's control of the tempo of an operation may also forestall

culmination. Culmination is similar to the facet of arranging operations in that the commander requires constant information to evaluate the status and tempo of operations. C2W does not necessarily contribute to the forestalling of culmination. Other applications of information can alert a commander to the likely enemy culmination point so that the commander can anticipate and array his forces appropriately.

**TERMINATION.** Commanders consider the conditions necessary to favorably end military operations.<sup>32</sup> The decision to end military operations is information intensive. As with the facets arranging operations and culmination, it is the difficulty in correctly identifying the appropriate conditions that makes termination complex and dangerous. The decision to end the ground war of Operation Desert Storm left in place many of the conditions that precipitated the original conflict. C2W does not facilitate termination. IW, through improved situational awareness capabilities, may help a commander avoid the recognition problems that prevailed at the end of the Gulf War.

## CHAPTER IV

### CONCLUSION

An analysis of C2W through the lens of operational art reveals the limited nature of the current C2W strategy. It defines itself through its components -- EW, PSYOP, OPSEC, military deception and physical destruction -- rather than by the dynamics of information and information functions. These components are not necessarily connected to the information revolution and do not provide a basis for the inclusion of emerging information technologies. C2W has a disconnect with the information technology available to conduct information operations across the continuum of military operations and all dimension of combat power.

“For to win one hundred victories in one hundred battles is not the acme of skill. Thus what is of supreme importance is to attack the enemy’s strategy.”<sup>33</sup> Information technologies will change the way the U.S. military generates and sustains combat power. The commander’s vision and view of the battlefield will be shared at the lowest level. Every member of the military will ultimately contribute to the conduct of Information Warfare. The lessons of Operation Desert Storm should not be allowed to confine C2W to a form of lethal and non-lethal operational fires. The focus on nodes, networks and switches obscures Sun Tzu’s challenge to attack an opponent’s strategy. The contribution of information technology to the concept of battle command and dominant battlefield awareness is key to defeating an opponent and best serves the operational commander’s needs.

Information technology is deeply embedded in our military operations and requires protection. Information functions expressed in the term "OODA Loop" enhance combat power and assist the operational commander in all facets of operational art. The destruction of enemy information capabilities allows the U.S. military to dominate the information realm. C2W strategy must be expanded to include these three broad functions -- information protection, information operations and information dominance. The expansion of C2W into the larger arena of IW will provide the operational commander greater ability to place and keep the enemy at a disadvantage in this and the next century.

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